DOCUMENT RESUME

ED 179 361 SE 028 777

AUTHOR Boyer, Robert; And Others
TITLE Environmental Studies, Section I: Man's Effect on Nature. Learning Carrel Lesson 6.2: Land Use. Study Guide and Script.
INSTITUTION Texas Univ., Austin. Dept. of Geological Sciences.; Texas Univ., Austin. Science Education Center.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE [75]
GRANT NSF-GY-9335-EZ
NOTE 42p.; For related documents, see SE 028 775-788

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Audiovisual Instruction; College Science; *Curriculum Development; *Earth Science; Environmental Education; *Higher Education; Individualized Instruction; Instructional Materials; *Land Use; *Learning Modules; *Science Education; Science Instruction; Undergraduate Study

ABSTRACT

This is one of a series of 14 instructional components of a semester-long, environmental earth science course developed for undergraduate students. The course includes lectures, discussion sessions, and individualized learning carrel lessons. Presented are the study guide and script for a learning carrel lesson on land use. The slides, audio-cassette tape, and other materials necessary to the lesson are not included. (BT)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Final Report
3 of 16 parts
Archives of
HIGHER EDUCATION IN SCIENCE
ATP/SCIEP/ASSS
Property of
THE NATIONAL SCIENCE FOUNDATION
GY-9335 (E2)

SCIENCE EDUCATION CENTER

ED179361

STUDY GUIDE AND SCRIPT

SECTION I: MAN'S EFFECT ON NATURE

LESSON 6.2: LAND USE

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Mary L. Charles
NSF

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ENVIRONMENTAL STUDIES

A Cooperative Project of The Department of Geological Sciences and the Science Education Center

The University of Texas at Austin

SE 028 777

ENVIRONMENTAL EARTH SCIENCE

"Environmental Earth Science" is a new course developed at The University of Texas at Austin by the Department of Geological Sciences and the Science Education Center. It is offered at The University of Texas at Austin as Geology 361K and has been tried out during the spring semesters of 1972, 1973, 1974, and 1975. Revisions have been made as necessary after each tryout. The project within which the course has been developed has been supported by the National Science Foundation.

The course includes lectures, discussion sessions, and individualized Learning Carrel Lessons. Extensive use has been made of multi-media technology in the presentation of the course. Learning Carrels for individualized instruction have been especially designed for this program. The lectures introduce specific topics, suggest problems or questions, and provide background information. The discussion sessions provide the student an opportunity to ask questions and clarify ideas. The discussion sessions also provide input and feedback to the instructor.

The Learning Carrel Lessons have been written by faculty and graduate students in the geological sciences and in science education. Writers and resource contributors include Dr. Robert Boyer, Dr. Rolland Bartholomew, Dr. Keith Young, Dr. Samuel Ellison, Dr. James Underwood, Dr. David Butts, Dr. Addison E. Lee, David Keller, Melanie Lewis, Wayne Schade, Ann Lee, and William McLoda. Technicians involved in production of scripts, sound, and photography were Stan Prescott, Lee West, Charles Geffen, and William McLoda. Artists were Jesus Rivas, Alice Canestaro, Aly Knox, and Javier Flores.

Each Learning Carrel Lesson consists of a set of 2 x 2 slides, an audio cassette tape, a study guide, a script, and other materials necessary to the lesson. The study guide and script are in this booklet. Students may set their own time schedule within an announced period when slides and tapes are made available.

The student should note the list of Learning Carrel Lesson topics to place in proper content the lesson in this booklet, and then read carefully the introduction, rationale, prerequisites, and lesson objectives in the study guide. The student should follow the instructions in the study guide for the entire lesson. In some instances, these instructions are also repeated on the audio cassette tape. The slides and tapes have been synchronized to automatically advance the slides appropriate to the audiotape. However, there is a tone signal given before the change of each slide so that the lesson can be used outside of the carrel if automatic facilities are not available. When the student is ready to start the lesson, the "on" switch should be pushed. If the slides and tape are operated manually, both will need to be turned "on." The first slide is always a title slide or a blank solid colored slide. If

the slides and tape are manually operated, this title or blank slide should be on view before the tape is started. For automatic operation, the slides and tapes will be set up by the Instructor or Proctor before the lesson and between each use. It is most important to start each lesson according to these instructions in order to provide synchronization of the slides and tape. Remember that slides placed in the tray to be used with a rear view screen are reversed from those to be used with a front view screen.

The student will be instructed by the study guide and/or the tape to stop at various places to carry out certain activities. Usually the audio-tape will say, "Please stop the tape now and restart only when you have finished this exercise." Therefore, the student should wait a few seconds to finish hearing the instruction after the word "Stop." However, one should not wait long enough for the tone signal or automatic change to the next slide. This signal should be heard after you restart the tape. If the lesson is moving too rapidly, the student may stop the tape and slides at any time to consult the study guide or script, but it is NOT POSSIBLE to back up and re-examine a given slide without completing the entire cycle of the lesson.

It is particularly important for the student to carry out the instructions for activities given in the study guide. In order that a record may be maintained of these activities, each student should pick up a copy of the STUDENT RESPONSE SHEET which include questions to be answered and the other activities requiring responses. These should be completed and turned in to the instructor as required for grading, feedback for the instructor, and to provide a basis for student interaction in the discussion group.

Each Learning Carrel Lesson is independent within the context of the course. Some of them provide direct information on a given topic, but in an individualized mode requiring some activities and thought on the part of the student. Others place the student in a role-playing situation where some position must be taken on provocative questions or issues. Others deal primarily with applications of environmental information. In all the lessons, the student is expected to receive basic information that is coordinated with the lectures, the small group discussions, and the readings.

STUDY GUIDE FOR LEARNING CARREL LESSON

6.2

LAND USE

ENVIRONMENTAL STUDIES

A Cooperative Project of the Department
of Geological Sciences and the Science
Education Center

THE UNIVERSITY OF TEXAS AT AUSTIN

ENVIRONMENTAL EARTH SCIENCE

LEARNING CARREL LESSONS

Section I: Man's Effect on Nature

Lesson 6.1: Population
Lesson 6.2: Land Use
Lesson 6.3: Urban Crisis (Field Trip)

Section II: Energy

Lesson 6.4: Energy
Lesson 6.5: Energy Resources
Lesson 6.6: Future Projections

Section III: Processes Through Time

Lesson 6.7: Geologic Time
Lesson 6.8: Long Term Events
Lesson 6.9: Short Term Events

Section IV: Natural Resources

Lesson 6.10: Minerals
Lesson 6.11: Conflicts of Interest
Lesson 6.12: Soils
Lesson 6.13: Water

Section V: Oceanography

Lesson 6.14: Ocean Resources
Lesson 6.15: Pollution of the Oceans

TO THE STUDENT:

This booklet contains two sections: (1) the Student Study Guide for this lesson, and (2) the Script or printed copy of the discussion recorded on the audio cassette tape.

You are expected to begin with the printed instructions in the Study Guide and follow them continuously as you study the lesson. In many instances the same or similar instructions may also be heard on the audio cassette tape. Refer to the script only if you need to refresh your memory as to something that was said. The script is provided because you cannot back up the tape if you need to review something already said on the tape.

Specific instructions will be given in the Study Guide as to when to start and stop the tape. Do not restart the tape until instructed to do so in the Study Guide.

Questions requiring written answers should be completed on the STUDENT RESPONSE SHEETS provided by the Instructor.

INSTRUCTIONS:

1. Start the audio cassette tape. Listen to the tape and view the slides until the title slide, "Land Use Planning Maps," is shown and you are instructed to stop the tape.

2. Read the Introduction, Rationale and Objectives for this lesson that follows. Also turn to the back of the Study Guide and study the Glossary in order to become familiar with the terms used in this lesson. If you have questions, check with the Instructor or Proctor.

INTRODUCTION:

"During the reign of Augustus, nearly 2,000 years ago, Vitruvius, a Roman architect, cautioned his colleagues to locate their buildings and cities with care and understanding of the natural environment. Now we stand poised to explore other plants, and it is ironic that geologists are just beginning to study carefully the role of their science in urban land-use planning. Our knowledge of the natural environment is vastly greater than that of Vitruvius' time but our problems are far more complex and land use is much more intense. More than half of the 200 million people in the United States live in urban clusters that occupy only 10 percent of the nation's acreage. If the land is to support, literally and figuratively,

such densely populated metropolitan centers, knowledge of the geologic environment must be incorporated routinely into the planning of our cities." (A Pilot Study of Land-Use Planning and Environmental Geology, State Geological Survey of Kansas, Report No. 15.D)

RATIONALE:

You play many roles and serve many functions in this society. As a citizen, educator, and homeowner, you will have opportunities to determine the use of our planet whether voting on a bond issue, educating students, or selecting your own homesite. You can make more accurate decisions if you know about the need of land use planning maps* and how to use them.

OBJECTIVES OF THIS LESSON:

After you complete this lesson you should be able to:

1. construct suitability maps* from land use planning maps
2. interpret land use planning maps
3. identify uses of rock units* when provided with descriptions of those units
4. describe how land use planning maps are constructed
5. recognize the need for construction of land use planning maps
6. cite examples of negative consequences that can result from not being aware of the geology of an area before constructing on it

INSTRUCTIONS:

3. Restart the audio cassette tape. Listen to the tape and view the slides until reference is made to the activity on page 3 of this Study Guide. Then STOP THE TAPE AND SLIDES and proceed with Activity #1 that follows.

Note: Words with an * indicate that they are defined in the Glossary at the back of the Study Guide.

Activity #1

Below are descriptions of two geologic unit descriptions as you would find them in a geologic land use planning map series. On the basis of these descriptions, answer the questions below about land use of the two rock units. (USE STUDENT RESPONSE SHEETS)

GEOLOGIC UNIT	GENERAL CHARACTERISTICS	SLOPE STABILITY	EXCAVATION CHARACTERISTICS	FOUNDATION CHARACTERISTICS	INFILTRATION CAPACITY	ROCK AND MINERAL RESOURCES
Buda Formation	Gray to tan, hard, fine-grained limestone. Lower part less resistant and slightly nodular weathering. Commonly forms steep slopes above Del Rio Clay. Live Oak, juniper, elm, and hackberry are common on this unit.	Generally high but may fail at edges of steep slopes above weak Del Rio Clay	Excavation difficult; generally requires blasting	Bearing capacity generally high, but may be low at outcrop edge above slopes of Del Rio Clay	Low	None
Del Rio Clay	Dark gray to olive brown, calcareous clay. Del Rio slopes readily fail by slide and creep; slopes commonly covered with a thin layer of Buda limestone rubble which supports typically limestone vegetation of live oak and juniper. Elsewhere the Del Rio supports only a cover of grass and scattered mesquite trees.	Low; decreases with increasing moisture content; fails when wet on shallow slopes	Moderately easy to excavate with light machinery	Bearing capacity low; structures need special support; high shrink-swell	Low; inadequate absorption of septic tank effluent	None

1. Where would it be easier to construct underground utilities?

   Buda Limestone ____
   Del Rio Clay ____
   Why?

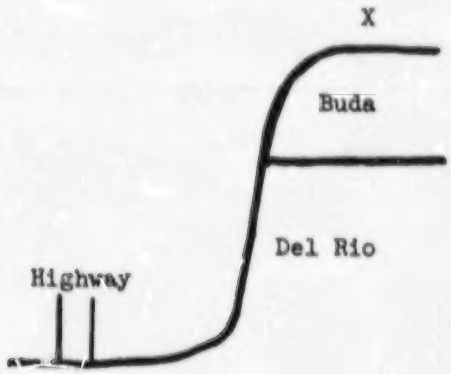
2. You have the choice of two building sites on which to build a home. One is on Buda Limestone, the other on Del Rio Clay. Both are relatively flat topography.* Which would you choose?

   Buda Limestone ____
   Del Rio Clay ____
   Explain your choice.

3. You are president of the River City Garden Club which is about to select a new site for its clubhouse. You plan to plant a lush garden around the clubhouse which shows native trees of your state. On which rock unit would you prefer to build?

   Buda Limestone ____
   Del Rio Clay ____
   Why?

4. You have found a beautiful building site (x) with a gorgeous view (see figure below). A highway was just cut through the valley below it and the cliff cleared of rubble and boulders. Would you feel confident building at x? Why or why not?



Yes ____ No ____

Why?

INSTRUCTIONS:

4. Restart the audio cassette tape. Listen to the tape and view the slides until reference is made to the activity on page 5 of this Study Guide. Then STOP THE TAPE AND SLIDES and proceed with this activity.

Activity #2

Tony Odoms has bought 640 acres of land and wants to build one and two-story private residences with full basements on it. He is restricted to building sites with the following qualifications:

1. Sites must have slopes of no more than 15% grade
2. Bedrock on the sites should be no less than 5 to 10 feet below the surface to avoid expensive blasting and excavation procedures
3. Sites must avoid natural drainage ways in order to prevent flooding and dampness in basements

In the back of your Study Guide is an envelope containing three maps and one blank transparency. The three maps are (1) a simplified slope map, (2) a depth to bedrock map, and (3) a drainage map.

Using the blank transparency and a wax pencil, CONSTRUCT A SUITABILITY MAP showing the areas that satisfy the above three qualifications. Place the transparency on each of the three maps individually and mark the areas that are not suitable. You can then identify the areas that are suitable for construction of the residences for Tony Odoms real estate project.

INSTRUCTIONS:

5. When you have completed the above activity, restart the audio cassette tape and view the remaining slides in this lesson.

ANSWERS TO QUESTIONS IN STUDY GUIDE

ACTIVITY #1 Answers

Given data concerning Buda Formation and Del Rio Clay

1. Where would it be easier to construct underground utilities?

   Buda Limestone ____
   Del Rio Clay X

   Why?

   It would be easier to construct underground utilities on Del Rio Clay. As you can tell from the "excavation characteristics" column of the description of the rock units, excavation in Buda Limestone is difficult and "generally requires blasting." However, Del Rio Clay on the other hand is "moderately easy to excavate with light machinery."

2. You have the choice of two building sites on which to build a home. One is on Buda Limestone, the other on Del Rio Clay. Both are relatively flat topography.* Which would you choose?

   Buda Limestone X
   Del Rio Clay ____

   Explain your choice.

   Del Rio Clay has a high shrink/swell ratio. Del Rio Clay is also unideal for the installation of septic tanks. This means that unless a select fill of gravel and/or a special foundation is included in the construction, you can be assured your house will develop cracks and will settle unevenly. Doors and windows will not close properly. Del Rio is easier to excavate than is Buda; however, if no basement is planned there will probably be little difference in excavation costs on the two rock units.

   Assuming that the Buda Limestone site is not at the edge of a steep slope above Del Rio Clay, the Buda Limestone site would be preferable. The Limestone unit has none of the unfavorable characteristics of the Clay unit and has a high bearing capacity.

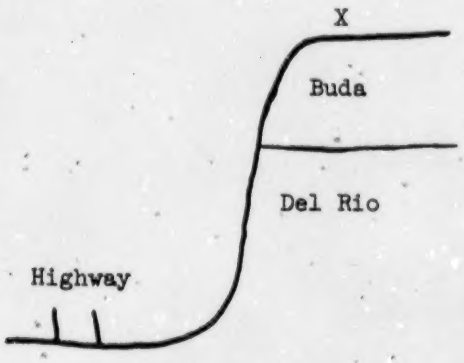
3. You are president of the River City Garden Club which is about to select a new site for its clubhouse. You plan to plant a lush garden around the clubhouse which shows native trees of your state. on which rock unit would you prefer to build?

   Buda Limestone X
   Del Rio Clay ____

   Why?

You will note from the General Descriptions of the two formations that Buda Limestone supports the growth of four native trees, but Del Rio Clay supports only two. Therefore, Buda Limestone is the optimum choice for a garden of native trees.

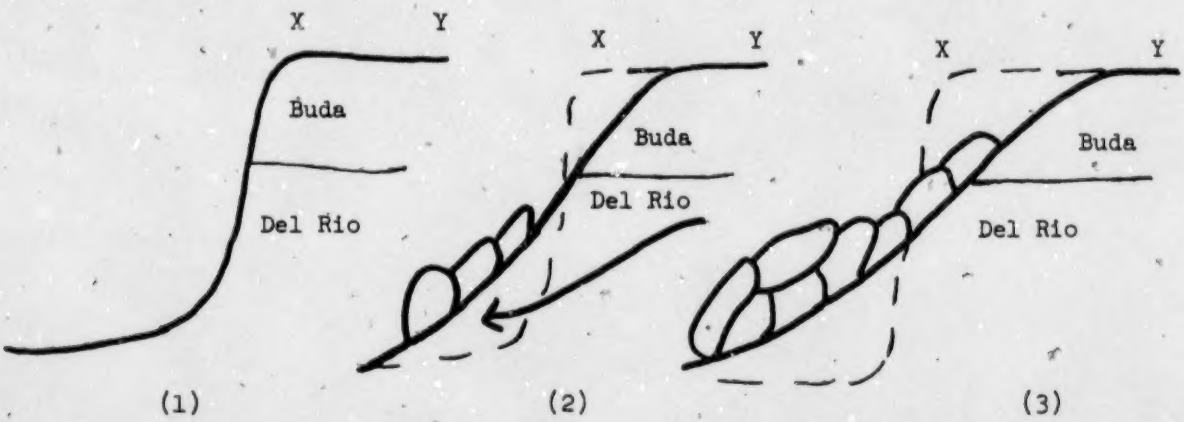
4. You have found a beautiful building site (x) with a gorgeous view (see figure below). A highway was just cut through the valley below it and the cliff cleared of rubble and boulders. Would you feel confident building at x? Why or why not?



Yes ____ No X

Why?

Buda Limestone falls on steep slopes above Del Rio Clay. Therefore, X is not a wise choice for a house site. Since Buda Limestone falls on steep slopes above Del Rio Clay, it would be unwise to build on the edge of the cliff. The Del Rio Clay will begin to creep down the hill and limestone above it will fall and slump down slope, thereby stabilizing the slope. You will then have the view at Y that you so badly wanted at X.



GLOSSARY

alluvium: a general term for sediments deposited by rivers and streams.

bedrock: any solid rock exposed at the surface of the earth or overlain by gravel, sand, clay, etc.

cartographer: person who constructs a map when given all the field information about the area to be mapped.

cartography: the science and art of map construction.

city planner: the person who supervises, participates in, and recommends social and economic planning for a particular city.

clay: a widely distributed earthy substance, plastic when moist, composed primarily of decomposed igneous and metamorphic rocks rich in the mineral feldspar.

effluent: liquid discharged as waste (as water used in industrial processes or sewage).

formation: a unit of rock which is identifiable by lithologic or structural features.

geologic map: maps which show the location of all rock units in an area, and identify those rock units by color and/or symbols.

geology: the science which treats of the earth, the rocks of which it is composed, and the changes which it has undergone.

land use planning maps: those maps which were constructed to assist in the wise planning and use of land. A set of such maps usually include data about soil, vegetation, depth to bedrock, slope, physical properties of soil and rocks, geology, engineering characteristics, etc.

limestone: a bedded sedimentary rock consisting chiefly of calcium carbonate ($CaCO_3$).

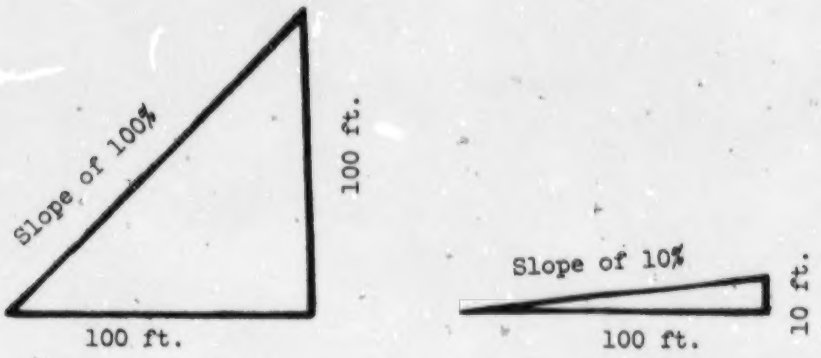
rock unit: see "formation."

septic tanks: a tank in which the organic solid matter of continuously flowing sewage is deposited and retained until it has been disintegrated by anaerobic bacteria.

shrink/swell: an expression which indicates an extreme fluctuation in the volume of a soil, proportional to the amount of water it has absorbed. For example, some clays when wet expand to 13 times their dry size; they are said to have a high shrink/swell.

shale: a rock formed by the consolidation of clay, mud, or silt, and has a finely stratified structure parallel to bedding.

slope map: a map which described slopes in percentage of rise per unit of horizontal distance (see figure). In this system of measurement, a slope of 45 degrees is equal to a slope of 100 percent.



suitability maps: a map which indicates where the most suitable land for any one purpose is found. For example, a suitability map for residences with basements would show the most suitable areas for construction of such buildings.

topographic map: a map that shows the surface features of a region, including hills, rivers, cities, etc., generally through the use of special symbols and contour lines.

topography: the physical features of a region, especially the relief and contour of the land.

utility pipes: pipes through which water, gas, or sewage flow, usually underground.

BIBLIOGRAPHY

A Pilot Study of Land-Use Planning and Environmental Geology. State Geological Survey of Kansas. Planning for Development "701" Project No. KANS. P-43, Report No. 15.D. June, 1968.

Flawn, Peter T. Environmental Geology: Conservation, Land-Use Planning, and Resource Management. New York: Harper and Row, 1970.

McHarg, Ian L. Design with Nature. Garden City, New York: Natural History Press, 1969.

SCRIPT FOR LEARNING CARREL LESSON

6.2

LAND USE

ENVIRONMENTAL STUDIES

A Cooperative Project of the Department of Geological Sciences and the Science Education Center

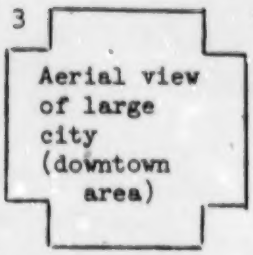
THE UNIVERSITY OF TEXAS AT AUSTIN

1

2

About four billion people live on the surface of the planet Earth.

3



Man has been physically confined to this ribbon of life ever since he appeared here.

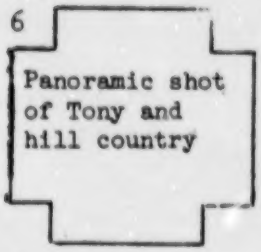
4

Meet Tony Odoms, a real estate developer.

5

Tony has just purchased this 640 acres of land.

6

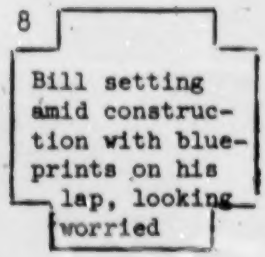


He plans to build a subdivision of one and two-story private residences with full basements on it.

7

But he has a problem. Which sites should he choose to build on?

8



It worries him because his friend, Bill Cantrell, just went broke trying to build a subdivision where there was solid rock two feet under the weeds.

9

Bill in front of "Condemned" apartment building

Before that, his friend Bill built an apartment complex which was flooded three weeks after it was completed. And before that ...

10

Tony digging frantically in his ground with a shovel

Well, anyway, Tony is beginning to suspect he should find out a little more about his land than Bill did before he decides what he is going to use it for.

11

Tony holding up big hunk of limestone and scratching his head

Tony has heard about geology, but he knows nothing about it himself. Where does he go to find out about his land?

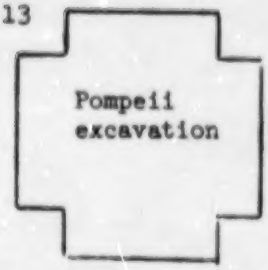
12

LAND USE PLANNING MAPS
LCL 6.2

This lesson is about land use planning maps. Before you begin, please open your Study Guide and read pages 1 and 2 and the Glossary in the back of your Study Guide.

Stop the tape now.

13



For thousands of years, earthquakes and volcanoes have destroyed cities.

14

However, men continue to build on the slopes of the active volcanoes,

---

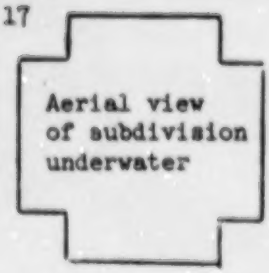
15

and in zones of violent earthquakes.

16

Centuries and aeons ago, floods destroyed cities and populations.

17



Yet, man still builds and concentrates in areas of heavy flooding.

18

For a long time we have been told that the foolish man builds his house upon the sand,

---

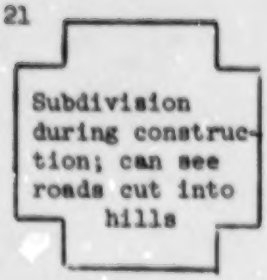
19

yet we still haven't gotten the idea.

20

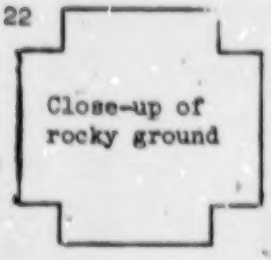
It's not only in great catastrophies that poor land use is revealed. There are other smaller, more frustrating mistakes -- all of which could have been prevented.

21



You have already heard about the housing development which was begun in an area where limestone lay only a few feet below the surface. Unaware of this, the developer had planned for basements in the houses, and underground utilities.

22

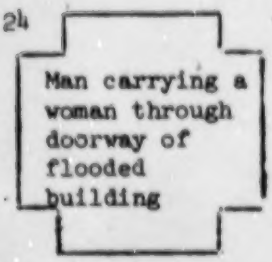


As construction progressed, plans for basements had to be revised or abandoned; utility ditches had to be excavated in rock, causing considerable expense to residents, the city, and the developer.

23

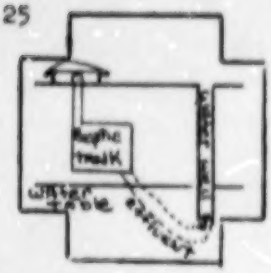
An apartment complex was constructed near the juncture of two creeks.

24



Shortly after completion, a summer rainstorm flooded the area, leaving twelve to fifteen inches of water in the first floor apartments.

25



City septic tanks have been built on flood plains and are releasing polluted effluent into the same gravel and sand from which the water supply for that same city is pumped.

26

Rusted utility pipes

Utility pipes are laid under a very corrosive soil. Three years later, the pipes must be dug up and replaced with pipes made of material which does not react chemically with the soil,

---

27

One man explaining a geology map to another

and the list goes on and on. The real tragedy is that all these mistakes could have been avoided if the city's builders and planners had been provided with geological data about these sites.

28

Geologist in field

The person most qualified to provide information of this sort is the geologist who for years has been portraying this information on maps.

29

City and regional planning has recently assumed a greater priority as our cities have begun expanding at an explosive rate. It has been recognized that the basis for any planning venture should be knowledge of the land itself.

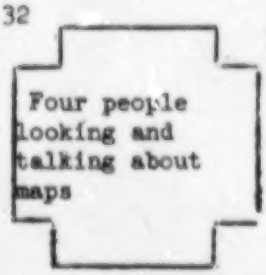
30

(City Planner's voice) The planning department staff has felt for a long time that geology is probably one of the most important inputs to land use decisions. Consequently, it was our decision to use the environmental geology and the geological derivative maps as the base for all of our planning from this point.

31

(City Planner's voice) This means that (1) the location of major streets, (2) the distribution of performance standards for zoning applications, (3) performance standards for building sites, and (4) the performance standards for construction codes will all be based on the derivative maps prepared from the inventory of geological information. This will be the beginning point, not the end point.

32



The development of land use planning maps is a team effort requiring the contribution of many people.

33

Once the decision has been made to map an area for the purpose of land use planning, the geologists who will be doing the mapping meet with city planners, local architects, and other people who work with the physical environment to determine what information is needed and wanted on the maps for that area.

34

(City Planner's voice) I think two of the worst problems of which I am aware are first, limestone in the northwestern and western parts of the city where it is necessary to blast for utilities and for streets. We have some very extreme slopes west of the city as well.

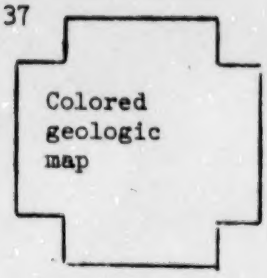
35

(City Planner's voice) The second extreme is in the eastern part of town there there is a lot of clay. When it rains and dries out, this clay tends to move around, making the correct design of foundations a problem. Again, we are also talking about streets and utilities that warp and crack, because this soil is so mobile.

36

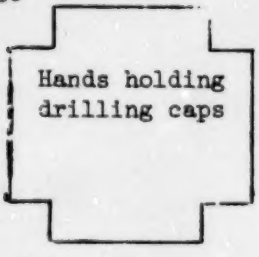
The first step in the project is the construction of a comprehensive and detailed geologic map of the area. In making geologic maps, it is conventional to show rock units as if no soil cover existed over them.

37



For example, all the yellow in this map represents alluvium, blue represents a shale, red represents a limestone, and the green another limestone unit, and the purple another shale unit.

38



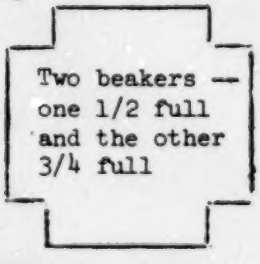
Engineering data is gathered from local engineering firms, state agencies, and city departments. Such data provide future builders and planners with information like ...

39

how much water a soil on a hillside can absorb before it will slide down the hill,

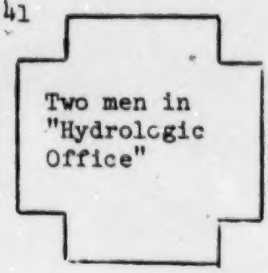
---

40



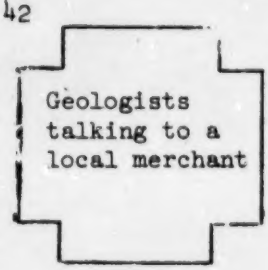
or the wet volume of a soil compared to its volume when dry.

41



Flood data is obtained from federal and state agencies,

42

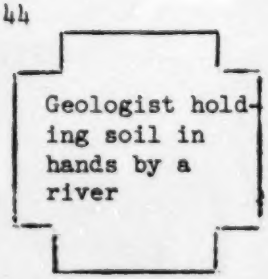


and sometimes in the field through interviews with local citizens.

43

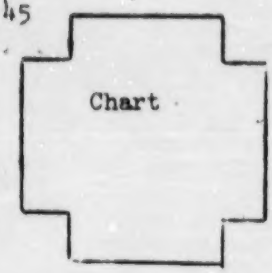
Current land use is also surveyed and mapped.

44



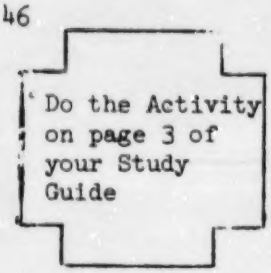
Other things mapped are vegetation and soils.

45



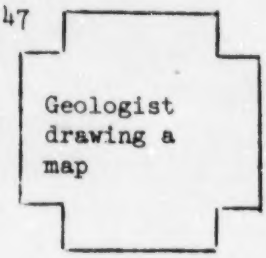
Once all this and other data are collected, the geologic formations in the map area are described in terms of this data. If you were given all this information about a particular rock unit -- soil and vegetation data, geologic and engineering data -- would you be able to make decisions about the optimum land use of that rock unit?

46



In your Study Guide on page 3, you will find an activity to do. Please stop the tape now.

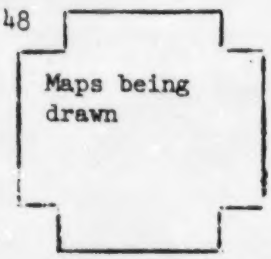
47



After all the data has been collected, the map-making begins. Project personnel decide, usually as a group, what kinds of maps will be published,

---

48



and then draw these maps in rough form on aerial photographs of topographic maps.

49

These rough maps are then given to cartographers who draw the final publishable maps. These are published and made available to the public and interested persons.

50

The published land use planning maps provide planners and developers with widely available data on which they can base important decisions.

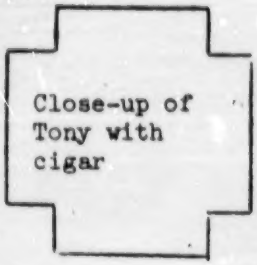
51

(City Planner's voice) These maps are going to be used as a part of our Master Plan Program. The inventories of soils, slopes, construction characteristics, and other parameters which are being provided will be our base for the Master Plan. These base maps will, in effect, say, "Here is where development can occur and here is where it should not occur for these reasons, both technical and non-technical."

52

If developers then take that information and insist on development at less than favorable sites, at least they have the technical background for street, home, and utility installation. They will not be developing blind.

53

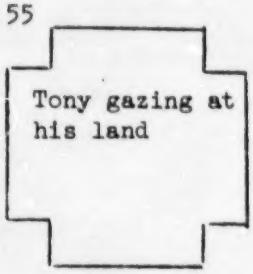


(Tony Odoms' voice) Hi there! You remember me, don't you? Tony Odoms, your friendly real estate developer.

54

(Odoms' voice) My troubles are over now. Solved all my problems with these land use planning maps.

55

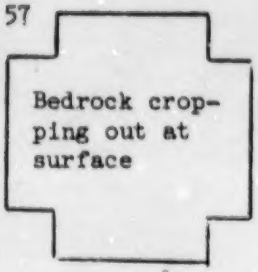


As you recall, Tony had just purchased this 640 acres of land, and wanted to build one and two-story private residences with full basements in this area. Tony soon decided that he was restricted to building sites with the following characteristics:

56

Sites must have slopes of no more than 15% grade.

57

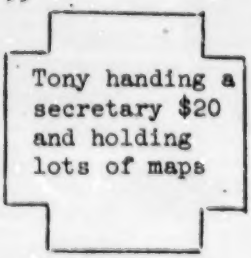


Bedrock on the sites should be between 5 and 10 feet below the surface, to avoid expensive blasting and excavation procedures.

58

Sites must avoid natural drainage ways in order to prevent flooding and dampness in basements.

59

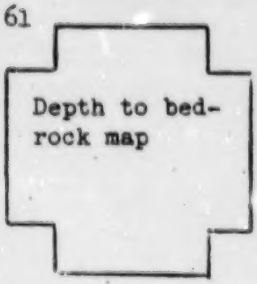


Tony found out from his local Zoning Commission that his area was included in a regional land use mapping project. The set of land use planning maps available included the following three which are of particular interest to him:

60

The natural drainage pattern map in which all dry and wet creekbeds and natural waterways are shown.

61



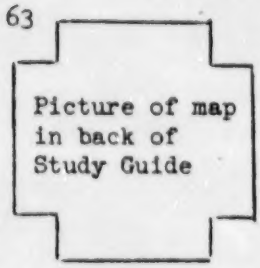
The depth to bedrock maps which simply indicate how many feet below the surface bedrock lies,

---

62

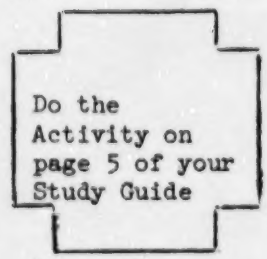
and the slope map which shows how steep the land is.

63



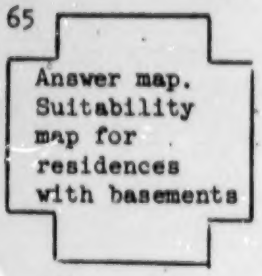
In the envelope in the back of your Study Guide, you will find three maps scaled down to the 640 acres Tony bought.

64



You will now construct suitability maps with these 3 maps. Please turn to page 5 in your Study Guide and read the instructions. Stop the tape now.

65

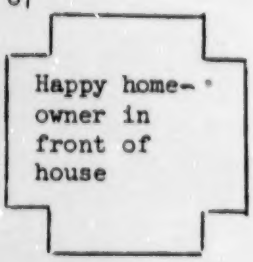


This is what your suitability map should look like. Stop the tape again and compare your map with this one.

66

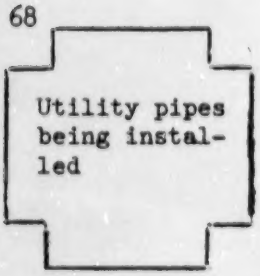
Land use planning maps can benefit everyone in a community. In the case we just saw, there were fewer mistakes made, and everyone saved —

67



the homeowner who paid less for his house,

68



the city who learned from the maps where to lay the streets and utilities,

69

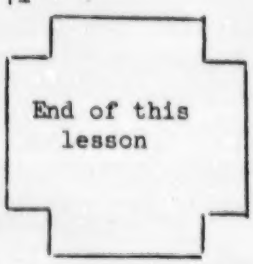
and the banks which weren't left with abandoned, flooded homes and unpaid mortgages.

70

Oh yes, and our friend Tony -- he saved money too.

(Tony's voice) Do you want to buy a new 3 bedroom, 2 bath, 2 car garage, all electric kitchen, land use planned home?

71



LESSON 6.2: LAND USE

STUDENT RESPONSE SHEETS

Name _____

Date _____

LESSON 6.2: LAND USE

STUDENT RESPONSE SHEET

Activity #1

Given data concerning Buda Formation and Del Rio clay

1. Where would it be easier to construct underground utilities? (Check correct formation)

   Buda Limestone ____
   Del Rio Clay ____

   Why?

2. You have the choice of two building sites on which to build a home. One is on Buda Limestone, the other on Del Rio Clay. Both are relatively flat topography. Which would you choose?

   Buda Limestone ____
   Del Rio Clay ____

   Explain your choice.

Name _____

Date _____

LESSON 6.2: LAND USE

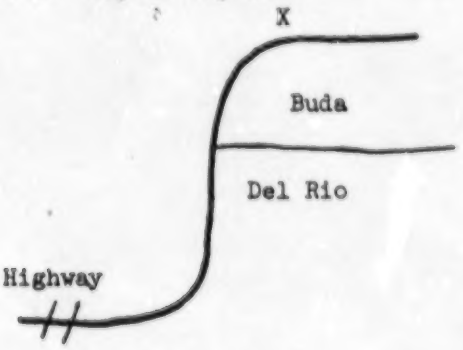
STUDENT RESPONSE SHEET

3. You are president of the River City Garden Club which is about to select a new site for its clubhouse. You plan to plant a lush garden around the clubhouse which shows native trees of your state. On which rock unit would you prefer to build?

Buda Limestone ___
Del Rio Clay ___

Why?

4. You have found a beautiful building site (x) with a gorgeous view (see figure below). A highway was just cut through the valley below it and the cliff cleared of rubble and boulders. Would you feel confident building at x? Why or why not?



Yes ___ No ___

Why?

Make blank transparency for map overlay.

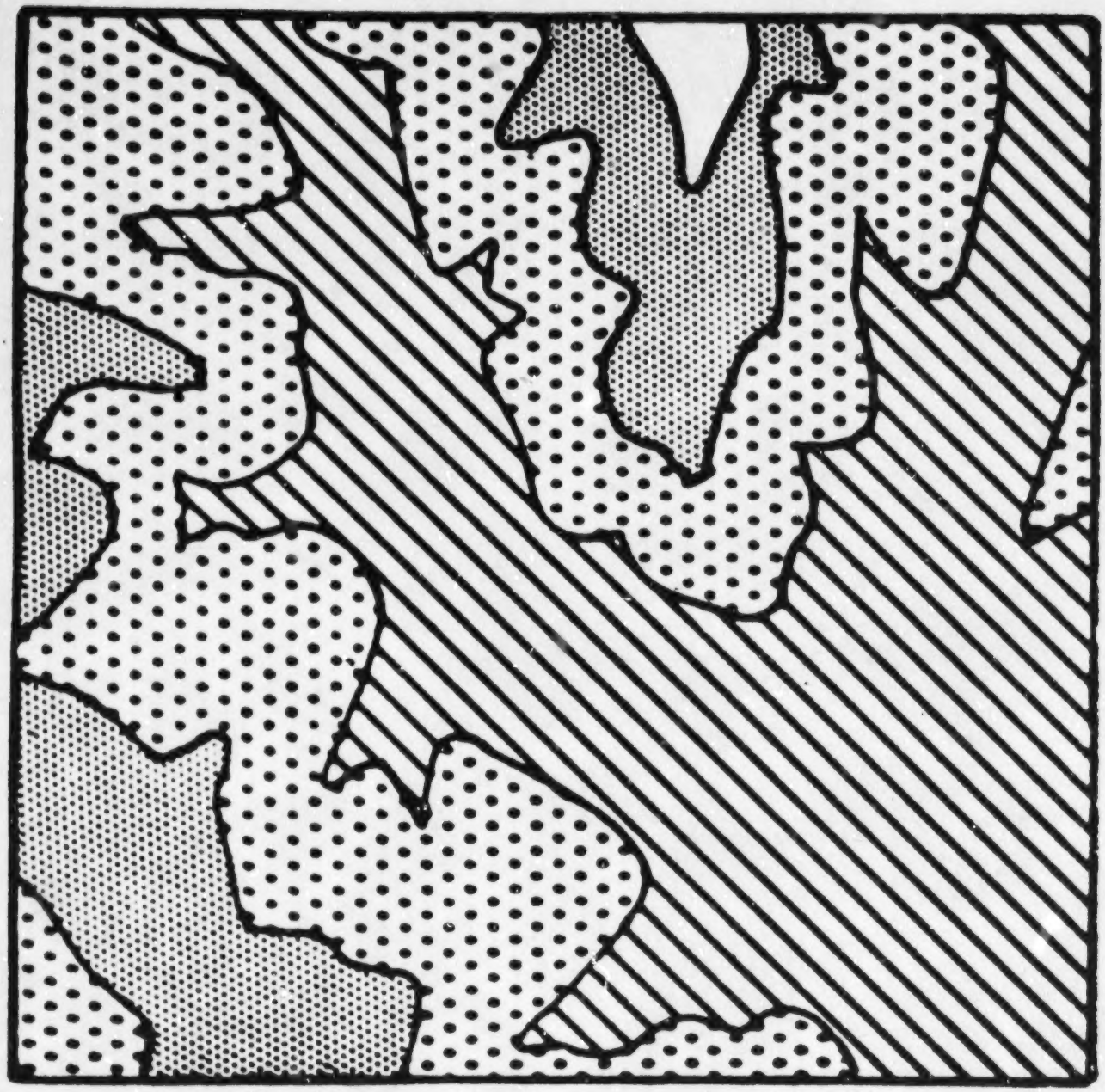
Instructor: Make transparencies
from this original

DRAINAGE MAP

STREAMS
GENERAL PATTERN OF STREAMS
LAND AREA

Instructor: Make transparencies
from this original

DEPTH TO BEDROCK



MATERIAL ABOVE BEDROCK IS MORE THAN 20 FT.

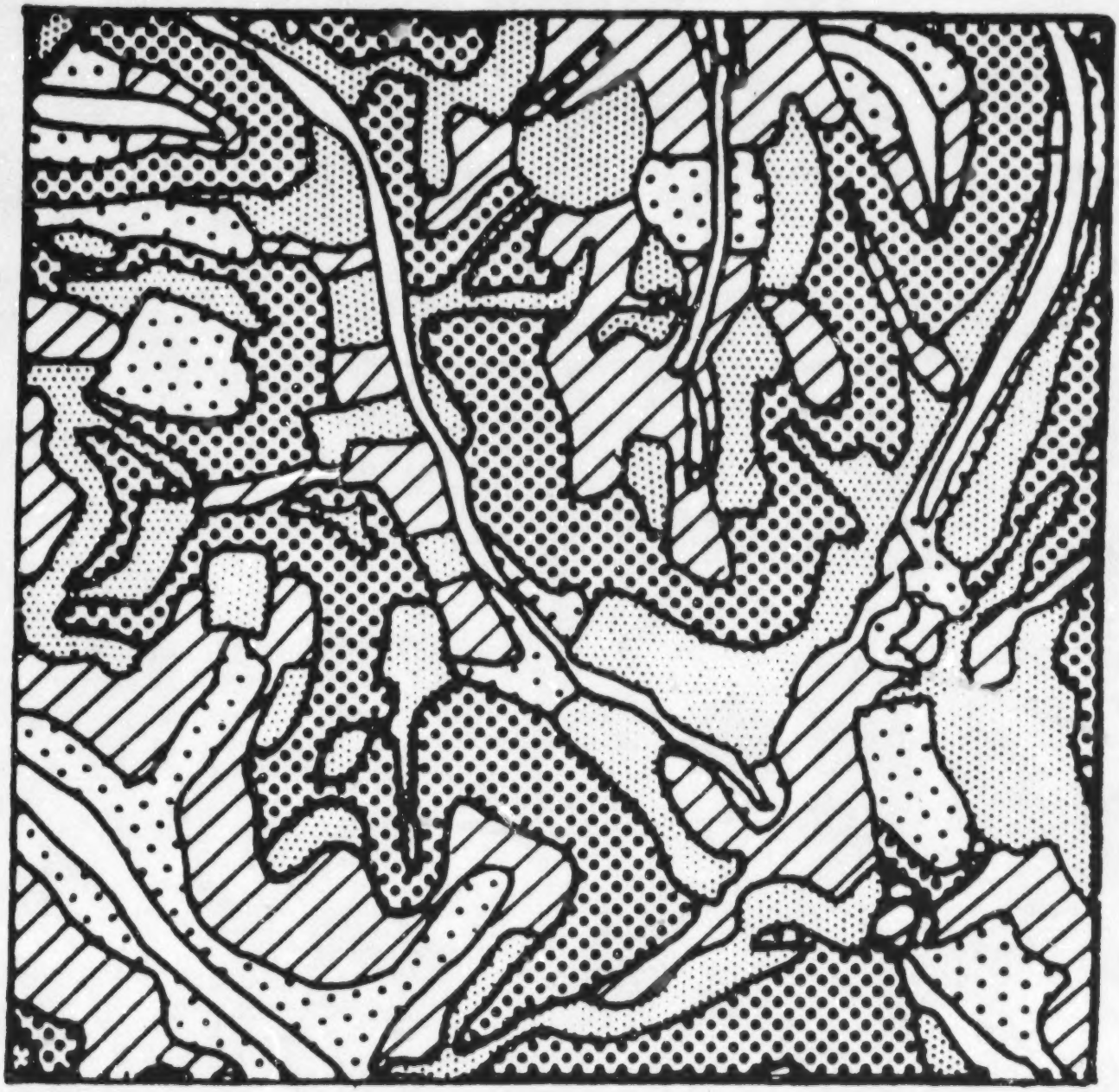
MATERIAL ABOVE BEDROCK IS 10 TO 20 FT.

MATERIAL ABOVE BEDROCK IS 5 TO 10 FT.

MATERIAL ABOVE BEDROCK IS LESS THAN 5 FT.

Instructor: Make transparencies
from this original

SIMPLIFIED SLOPE MAP



SLOPES GREATER THAN 15%

SLOPES OF 5 TO 15%

SLOPES OF 2 TO 5%

SLOPES OF 1 TO 2%

SLOPES LESS THAN 1% - 42